

1927

V.B.

Journal Notes of
Vernon Bailey

June 22 - July 22, 1927.

Minnesota to Nevada & Oregon

See notes on bats and bat caves

June 27

1927

Journal Notes - Vernon Bailey.

June 22. Left Minneapolis 7:40 P.M.
for Orinaba.

June 23 - Arrived Orinaba 7:40 A.M.
Up to Winnemucca, Nevada.

June 24 - Arrived Winnemucca 11:55
P.M. and went to Hotel Humboldt.

June 25. Got mail & worked on reports
and account and letters.

June 26 - To Hazen in evening and
out to Fallon by 10 P.M.

June 27 - Out to bat cave in edge
of valley 10 miles S.W. of Fallon
where we found lots of Myiarchus
usciatus and a few Antrozous pallidus
breeding in cave.

Fired into our colony and brought down two Antrozous each carrying small young clinging to the nipples. The young of one were apparently but a day old, male and female, blind, hairless, with wings more like feet than wings. The thumb with hook and four fingers only partly webbed.

The claws were well developed and sharp and curved and the bat used them skillfully in clinging



& its mother. Also the mouth was well armed with minute teeth like fine & short and hooked for clinging. Each was firmly attached to a wide, flat nipple that gave it a mouthful & set the minute teeth into and it clung so firmly that I was afraid of pulling off its head to get the last one loose from its dead mother the next day. It clung with teeth and all its hooked claws at once, its body in line with the mother so when she hung head down

so did the young one. I removed it next day
 and placed it on another live female
 whose young had been killed by the shot.
 Her young were twice as large and probably
 a week old with slightly better teeth and
 eye slit just beginning to open. They
 also were male & female, both saved for
 specimens, skin & skulls, see catalogue.

When the small young was placed on the breast
 of the other bat it grabbed a mouthful of hair
 and clasped her with hooked claws and
 in a moment more let go and poked the
 nipple and grabbed it securely. The old
 bat began to object as soon as she felt
 the little one on her and tried to push it
 away with her wing but could not,
 so she reached down and took its head
 in her mouth and forcibly tore it
 loose from the nipple and pushed it
 away. It squeaked and later in skinning it

41

tooth marks on one side of its head as in the ear on the other side. She knew it was not hers and intentionally injured it to make it leave her nipple.

The bat nipples are wide and flat for the whole width of a wide mouthed young and to give a greater clinging and carrying surface.

After hanging all night in a cloth sack in an outside open room where the temperature was chilly the young bat was cold and partially torpid in the morning but not so nearly torpid as the old bat in the same sack. It was not too helpless to use its claws in hanging on or slowly getting a new hold and if its teeth had been set on a nipple it would have been perfectly safe if the mother had awakened and flown away before it warmed up. However its temperature would depend on here and if both became torpid together probably both would warm up simultaneously.

The Nyctinomus mexicanus were far more numerous than the Antrozous and about a dozen were killed at the same spot that brought down two of the larger species. Some 50 or more were captured in a net as they flew out of the retreat in the roof of the cave and we estimated 500 or more that left the cave a little later as it got darker. Those captured were all females, each containing one large embryo that would probably have been borne in a week or 10 days. 3 specimens were saved and their embryos were preserved in alcohol.

On entering the cave we could easily locate the bat colonies by the constant squeaking from several cracks in the rocks overhead. They seemed to be crowding and quarreling for room or best places or it may have been a quarrel between the two species. In a sack they seemed to get along together all right.

June 28. Drove to Reno and back to Fallon, getting some camp supplies that we could not find elsewhere.

June 29. Fixed up the Chevrolet Touring car for a camp trip and got supplies and our outfit ready for starting tomorrow.

June 30 - Left Fallon 9:20 AM for Winnemucca and arrived there at 4 PM. about 150 miles, but 60% the way rough and slow.
Camped near the Humboldt River about 4 miles beyond Winnemucca on the M^c Dermitt Road. Mosquitoes bad.
Caught nothing in the traps.

July 1. Left Winnemucca in morning, heading north up the North Fork Humboldt Valley about 20 miles & then over a low divide or saddle & down into the Quinn River valley & up along the eastern edge to Mt. Desmit near the Oregon line. The valley has lots of ranches & broad grassy bottoms but the ranches are generally located on the small clear cold mountain streams coming down from the side slopes, were from the east slope out of the considerable mountain range included in the Santa Rosa Indian National Forest.

We crossed fully a dozen of these fine creeks and at Rebel Creek drove up to the old ranger station at the ^{mouth} head of the canyon for lunch & walked a mile or two up the canyon, hunting for woodchucks & canies. Found no signs of either but probably did not go high enough. The peaks are above timberline and have big banks of snow on the cold slopes and some timber in the gulches, mostly Populus trichocarpa & apparently aspen and mountain mahogany higher up. The middle slopes are mostly sagebrush and Balsamorhiza hirsuta & I mapped them with a broad belt of Transition & a narrow crest of Canadian zone. No pines or junipers were recognized on the slopes.

West of Quinn River is a high flat topped plateau called the Quinn River Range which is too high for Sonoran and not high enough for Canadian or many snowbanks. I mapped it as Transition with the broad Sonoran Quinn River valley between the two extending 20 miles north of Mc Dermott into Oregon but cut off from the Barren Valley Sonoran by low ridges not much above its level.

Reached Mc Dermott, 85 miles north of Winnemucca about 4 PM & continued on north east toward Rowe for some 30 miles, over the first ridge and down onto Jackass Creek and camped before reaching the highest summit in pure sagebrush Transition. Found big ground squirrels common about camp that seem like arvatus but are not. Also lots of the gray C. m. canus and got specimens of both.

Oroscoptes, amphispiza neoculmus & breweri sparrows are common.

9.

July 2 - Collected two of another big yellow ground squirrel very like elegans, all three species on the same ridge near camp and practically together.

Collected 2 species of rattlesnakes and several lizards, "

Mapped the trip goes from the top of a high butte near the summit where the Steen Mts, all snowing and high stood off most conspicuous and Quinn River, barren Alvard and the Quoyne valleys lay below me.

Continued on down to Rowe in the Quoyne and camped for the night. above the bridge a couple of miles.

This is a low hot valley, all upper Sonoran with lava flows over the badland lacustrine deposits.

Gathered a lot of bones of some large mammal like a buffalo but larger than a white canical butte 8 miles back from Rowe about 20 rods north of the road

Found no good trapping ground at our camp as the valley is alkaline & overstocked but there is good water in the Owyhee River & many irrigated alfalfa ranches. Sheep seem to be the principal industry & hay is raised & winter or lamb them on. A little barley or wheat is raised for the horses.

Grass is good over the summit on Jackass & Rattlesnake creeks & lots of pine horses & a few burrows were seen. No sheep or cattle.

Plants of Owyhee Valley.

Artimia tridentata . abn

" *spinescens* "

" *trifida* in our place common.

Zetachyma spinescens - abn.

" *canosa* - "

Chrysothamnus, gray "

Grayia polygaloides, gray "

Eurotia lanata "

Sarcobatus vermiculatus " in places

Sarcobatus "

Lepargyrea

Ribes aurum

Salix

gray

Atriplex confertifolia, abn.

" "

" *hastata* "

Rumex "

Opuntia " near Crooked Cr.

Nicotiana " on sandy soil

Mentzelia small " " "

Sinks of Whitehouse Cr. July 4 + 5.

Artemisia tridentata abn.

" *spumosa* "

Tetradymia 2 "

Chrysothamnus 2 "

Gutierrezia 1 "

Grayia

Eurotia

Atriplex confertifolia

" *canescens*

"

Sarcobatus

Lupinus pusillus

Chamaetia

Oryzopsis

July 3 - Went 30 miles east to Jordan Valley
 and got supplies. Then returned about 5 miles and
 camped at the reservoir on Jordan River above
 the Cow Creek lake valley in the midst of great
 lava rock plains covered with sagebrush.

Country all Upper Sonoran with a good
 representation of *Artemisia tridentata*, *Grayia*,
Eurotia, *Tetradymia*, *Chrysothamnus*, *Ribes*
aureum and *cereum*, *Lepargyrea* and the
 narrow leaved gray willow.

Low lava cones on all sides and bubble
 cones over the lava fields.

Country on edge of Transition & Sonoran
 with near tops clear sagebrush and warm
 slopes and vullupt mainly Sonoran.

July 1st

July 4th, West to Rome and then up Rocked
Creek and over low slopes to Sheep Creek
and Antelope Creek and then over the next
divide to a great Playa at about seems
to be the sink of White Horse Creek. Turned
back 4 miles and camped at edge of a
bare mud flat apparently 5×7 miles.
with big sand dunes around the edge.
Set traps in the sand dunes and out on
the hill tops.

This sandy valley is pure upper Sonoran
as shown by plants and animals.

July 5 - Caught *Perodipus*, *Perognathus*,
Microdipodops, *Oryzomys peromyscus sonoriensis*,
and *Citellus walleyi*. Saw *Eutamias pictus* and
signs of *Neotoma* probably *deserti* and
one set of old Thamnomy's hills.
Coyotes & badgers abn. Jackrabbits abn.

Continued up to Whitehorse Ranch.
about 10 miles and camped a half mile
beyond on the Denio Road just west of the
Creek and set traps both ways, out on
the desert west and back in the meadows.

14

The Whitehorse ranch is typical of the old time ranches, big and rambling with good buildings, corrals and fences. They raise horses and cattle and hay mostly wild native grasses, rye grass and Johnson grass but no alfalfa or other crops.

There is abundance of water in a large creek and many irrigation ditches carry it over meadows where grass grows big and out around the edges is lots of salt grass. Big pastures make winter range for stock.

There are lots of willows, bullberries, and tall sagebrush but no timber in sight.

The surrounding valleys are all Upper Sonoran but the meadows above are probably Transition.

~~Shot one~~
Saw lots of Citellus oregonus and caught one on the grassy bottom but mollis is all over the valley. Jackrabbits, Coyotes and badgers abundant.

Thomomys townsendi hills all over meadows.

July 6 Caught 2 *Thomomys townsendi*^{nevadensis}, *Neotoma*

cineas & *N. disectorum nevadensis*, *Perodipus*
publii, *Onychomys l. fuliginosus*, *Peromyscus*
sonoriensis, *Microtus montanus*. Jack rabbits
common. Coyotes & badgers common.

One bobcat track seen.

Continued on Denio Road but went up
Willow Creek too far and had to turn back.
Found a large leaved aspen, alders &
two large leaved willows on Willow Cr.
Several hot springs.

Crossed over low divide of Transition
zone and went down to Trout Creek
and thence across south end of Alvord
Valley at south of Denio.

Got gas & oil & grub and came
back north about 5 miles and camped on
clear cold stream out of southern end
of Steens Mts. Since I have no name so
we called it Climatic Creek from the abundance of *Climax*

July 7. Caught only Peregrinatus in the traps
where I hoped for Microdipodops.

Came about 35 miles north to Andrews where
we got gasolines and a little grub and went on
to the north end of the valley, or what seemed
the north end where it began to go down
toward the north but kept on the Burns
stage road over the northern arm of the Steens
Mts. to what was probably Mule, Smith,
Andrews and then back south 25 miles to
Deanard. Came 100 miles from Andrews.

The road was mostly very good but our boggy
grade with probably 1000 feet rise over the
big ridge. To the NE Alward Valley seems
continuous down to the Skull Springs
country and lower Malheur River Valley
but we did not go far enough to be sure.
It is certainly all low and soveran.

The big ridge is broadly transition with
mostly Artemisia arbuscula, Juniperus
occidentalis and along water courses willows
and Populus angustifolia. Made many
corrections to zone map.

Camped in meadow at Deanard. Mosquitoes bad.

Much snow on Stun Mts. Cuts high,
Abard lake full of water, Many other ponds &
marshes and huge playas in 3 or 4 basins
of the long Abard Valley from Tene Tene Lake
to Folley Farm. Low ridges toward Whitcomb
Playa, and a low gap almost connecting with the
big Andrews Playa.

July 8 - Drove up the Coacamongo Creek
 and camped at end of road about 6 miles
 from Diamond. above Browns Shupranets.
 Transition zone species come down the canyon,
Populus tremuloides, Alnus, Salix, Cornus,
Amenia and other trees & plants along
 the cold water creek.

July 10. Back to Diamond and over to the Blitzen River, then up the valley beyond Blitzen and the P. Ranch and camped in the sagebrush a mile beyond the last ranch and overlooking the whole length of the valley. Climbed the high ridge to the west - overlooking the Catlow Valley and made some good connections to the life zone map of Oregon. Both the Blitzen and Catlow valleys are Upper Sonoran while most of the ridges between are Transition.

The common juniper seems to be all occidentalis and mainly Transition all around the Stem Mts. and to the west. No junipers were found east of the Stem Mts., none of the *Monosperma* group anywhere and no nut pines so far.

The Stem Mountain zone map checks up very well.

The great extent of marsh and swamp and bottom land included in the Kiger and Blitzen valleys is a surprise to me, being hundreds of square miles of rich, well watered land, most of it yielding valuable grazing, hay or crops. The enormous tule swamps are especially valuable winter range for cattle and enormous quantities of hay are cut for winter feed.

Eventually vast areas of these valleys will be cultivated in alfalfa and grains as there is ample water supply for efficient irrigation but the old idea of stock ranges and open winter grazing still dominates the country. A great variety of Upper Sonoran crops, fruits and vegetables can be raised and comfortable homes will take the place of bare ranches and stock corrals.

Water can be pumped for irrigating many pieces of land not easily brought under ditch and most of the water of the valleys is pure mountain water.

At present no crops or trees are raised in the valleys except a few Lombardy popples at some of the older ranches and in a few places a little alfalfa, barley, wheat or rye for hay. In gardens are raised potatoes, onions, lettuce, peas and in one garden a little corn.

July 11. Drove down the Blitzen Valley to the Malheur Valley and across The Narrows and to Burns, 70 miles, got mail and camped by the Silvies River a mile north of Burns.

Upper Sonoran zone all the way with abundance of characteristic species of plants, mammals, birds and reptiles.

The water is high in Malheur Lake and Valley. Grass and crops are big and the enormous valley begins to look prosperous again.

July 12 Drove to Crane and around east end of Malheur Lake. Saw Benson at Voltaga and heard that the water is coming back and is 2 feet deep in the old bed of the lake. Still low but apparently coming up.

Camped at the Narrows, or about a mile SW of town near a rocky point and set 64 traps for Microdipodops. Found lots of tracks. in mellow silted sagebrush country, more or less weedy ground than on the sandy soil.

July 13 - Caught only one Microdipodops tho dozens of them tramped all around my traps and a few ate some bait. They seem not to care for rolled oats and the Victor mouse traps do not spring easily enough to catch any mice. Dug out one Micro but he escaped. Found several of their holes. Caught 4 Perodipus. Collected plants and drove down to Harvey Lake and found it with considerable water along the NW side. The greater part however dry.

Back to Burns and out to Experiment Station 8 miles east of Burns, where Orel Shattuck is in charge and doing splendid work. Just starting pump on new well today to irrigate 80 acres. A 25 horsepower pump throws 2000 gallons a minute - Will have report ready by fall. Apply for it to Gardiner at Davis, Calif. or to the Agr. College at Corvallis, Oregon. Returned to Burns and camped & made up specimens.

Mr. Shattuck says the climate of the Malheur Valley is not adapted to corn or any of the tender crops on account of frosty nights during every month of summer, but that over well irrigated areas there is much less frost, owing to the heat retention of moist air and that at slightly elevated localities there is less damage by frost. The rainfall of the valley is a fraction over 8 inches but in the hills west of Burns about 17 inches, only 10 miles away.

The crop adaptations of this great inland agricultural area, to be, are only in the beginning of experimentation but will eventually be solved by just such work as the experiment station is doing.

Alfalfa, Canadiana field peas, Sunflowers and grains are the promising crops now with enormous yields from abundance of good pure mountain water pumped up into very rich alluvial soil.

July 14 - Called on Prof. Henderson, state
 Botanist and Mr. Fellows at Burns and did
 not get off until 9 AM. Drove north
 to Canyon City and west to Dayville and
 4 miles beyond to a good camping place in
 the John Day Valley. Mapped the life zones
 and made many corrections in the map.
 Found Transition zone practically continuous
 from 10 miles north of Burns to John Day
 and in the bottom of the John Day valley
 all along. The west north side of the John
 Day Valley with an open southerly exposure
 seems to be pretty pure Sonoran and many
 of the bench tops and side slopes on the
 south side of the valley but the moist and
 often marshy bottomlands are cold and
 have much Populus trichocarpa, Alnus,
Betula fontinalis, and big leaved willows.
 Good crops of grain and alfalfa and even
 potatoes and some corn are raised and
 we saw ripe cherries and many orchards
 well loaded with apples.

July 15 -

Left Durville at 6 AM and took the road west to Pineville, a very poor road to Mitchell and then a fine graded & smoothly surfaced road over the Ochoce Mts and down to Pineville. Soon left the Sonoran valley of the John Day and came up over high Transition zone ridges, mostly pines, with scattered junipers occidentalis and sagebrush but all brown with small dry annual grasses and weeds. The Artemisia largely arbuscula. The yellow pine timber of the high ridges of mountains to the south a little above us and occasionally a yellow pine and a bunch of aspens down in the gulches to the west. A few dry grain farms on the plateaus and sheep ranches in the creek valleys where there is grass for hay. About 7 miles beyond Mitchell we struck up over the mountains through a broad belt of splendid Pinus ponderosa forest, and higher up on the slope found a dense growth of Tamarack, douglas spruce, balsam and along the streams aspen and alder.

Crossed the low western end of the Oeloso Range at 5298 feet and should call the upper 1000 feet of this Canadian zone an steep cold slopes. To the south and east the range runs much higher with many patches of snow on cold slopes near the top and I have mapped a Canadian zone strip along the crest on cold slopes. Down the range on the west we wound through miles and miles of beautiful open yellow pine woods to the foot near the big reservoirs where the firs begin and continue across the open valley to Prineville and beyond to Bend. Prineville and Redwood are in the upper edge of Sonoran zone but the edge of Sonoran and Transition is not very well defined. The varying basins and rapid air drainage mixing the two interminably.

The Prineville valley now has a large water supply for extensive irrigation and the ~~San~~ ^{Snake} valley at Bend is taking out most of the water from the river and developing enormous agricultural areas.

From Bend we drove 20 miles SE. to the bat caves, first visiting the Shelton Cave, an old lava tunnel which we followed for about a mile underground but gave up finding the end for lack of time. It is the typical lava cave with arched roof 10 to 40 feet high and 40 to 75 feet wide, sloping downward with generally flat sandy floors and where not sandy or blocked by fallen rocks with a central ridge and double side tracks.

The temperature was too cold for bats, probably about 45° but no ice or water was found in it.



Some 3 or 4 miles farther south and directly ^{NE}~~SE~~ of the Paulina Mts. we came to the Arnold Lee caves, a series of 7 cave-entrances along an old lava tunnel in about half a mile. Most of these are blocked up by the drop but two go down a few hundred

1. p. 27. The temperature of the Aspid Seal Cave
where the ice is most abundant at all points dry
is 35°F . at 4 feet above the floor. The ice
registered 32° . The outside entrance of the cave
is much warmer.

The dry caves where there is no water or
ice are warmer, probably 50° to 60° .

The Skeleton Cave I estimated at 45° .

The Lava Cave registered 40° .

27

hundred feet and contain some ice at the lower parts. In one there is water and the ice and in the other just smooth dry ice, fairly clean and when chipped up making good clean water. We used it for washing hands and dishes. These two caves are much too cold for bats but the upper cavities and front rooms are warmer and the other dry caverns are warm and full of cracks where bats may live and may find ways back to other warm chambers making good winter resorts.

A lot of bats came out of us to the entrances of the caves in the evening but we secured only one and it was Eptesicus fuscus. A smaller Myotis was equally common but the specimens shot fell among big rocks and bushes and could not be found.

28

July 16. Found two more cave entrances or
Cave-ins, making 7 in all at the Avoled Ice Cave.
Also found the floors of all the caves strewn
with wings and skulls of numerous moths and
butterflies and crane flies, where the bats had been
feeding overhead at night. The moths seem
to gather in the warm entrances of the caves
as do many birds and the bats.

Came back 8 miles on our road and
across 4 miles west to the Calif. Highway and
struck south toward Klamath Falls. At 22
miles south of Bend we came to the Lava Cave,
the largest, deepest and most extensive of the
Caves we have seen. It runs down about
100 feet deep and back as a large tunnel over
2 miles in extent but may go farther. The
tunnel is rather high and narrow, generally 75 feet
high and about as wide. A little water drips in
it and the air is damp and cold. Well back
beyond the daylight the temperature was 40°F .
No signs of bats or bat guano found and the
man in charge said no bats had been seen
in or around the cave.

He also told of the Horse Caves, near Bend, larger
and more interesting than the Avoled Caves.
There are said to be many other caves in the Lava beds.

From Bevel to Ft. Klamath the highway is all completed and the worst perfect road I ever saw, all oiled and smooth with few curves and no grades or hills except the one long easy drop from the summit at 5272 altitudes down to Ft. Klamath feet.

Much to my surprise we were in a continuous forest of lodgepoles pine from the west side of the Paulina Mts. 6 or 8 miles north of Lapine south to Ft. Klamath with the exception of a few warm slopes where yellow pines came in and the long grade above Ft. Klamath where Sugar pines, Cedars, balsams and aspens came in.

The extensive forest of lodgepoles grows on a yellow gravel or pumice plain where I suspect cold water runs over the rocks below and keeps the roots too cold for yellow pine for the sandy surface bears abundance of *Kingia tridentata* and *Ceanothus velutinus* all the way. I have mapped it as Canadian zone but with much doubt and hesitation.

The railroad at Bend is building southward beyond Lapine and will probably come through to some point farther south. The wonderful yellow pine forest is being rapidly reduced to stumps and brushheaps but generally a good stand of seed trees is left to reforest the otherwise worthless land.

The great extent of lodgepole pine forest extending from the Paulina Mts. west to the Cascades and south to Ft. Klamath will probably be lumbered later as it contains many trees of sawmill size and yielding good box lumber.

July 17, Sunday. The bears did not come around until after dark but tipped over all the garbage cans and made tracks all over camp.

Drove up to Crater Lake and walked down the trail to the lake and drove along the rim a quarter mile, as far as snowbanks would allow. Then drove back down to Klamath Falls and camped at the Automobile Camp 3 miles out on the road to Merrill and Alturas, a regular camp city with cabins, tents, shower baths, wood and water, stores, garages, gasoline, barber shops and recreation centers. A well planned camp with shade of rows of tall Lombardy poplars.

July 18. Came back to Kawath Falls and took my things to Bisbee Hotel and let Anna & Laura and Vernon start for home via Alturas, Susanville, Reno and Fallon. They will make it in two days over good roads.

Have had a wonderful trip and done an immense amount of work in the 18 days out from Fallon. Could have kept them and the car longer but could not pay even 7¢ mileage nor for gas and oil because my relatives furnished the car and did the work for me so the trip was too expensive for any of us to continue very long.

July 19 - Got my baggage readjusted
 Saw Elmer Applegate and gathered
 what information I could on plants and
 crops.

July 20 - Went to the County Agricultural
 Agent, Mr. Hudson, went over his his
 last annual reports for information on crops
 soils, climate and live stock and
 also got a lot of circulars and bulletins
 that will be a help in my life zone report.
 Also got maps and information folders from
 the Klamath Commercial Club and some
 forestry maps from the Forest Protective
 Association.

July

July 21 - Took bus over to Lohaview, 112 miles, leaving at 2 PM & arriving at 7.

Came by way of Oliva, Daisy, Boranga, Whiskey Creek, Beatty, Bly and Draw Creek. Was able to make many corrections in the life zone map and get a good idea of the country and its products.

There is a large reservoir on Draw Creek and at the edge of the water and close to the road were 2 flocks of Canada geese, about 100 in each, and perfectly obvious to passers by. Saw a jacksnipe in meadow near Lohaview, several Lewis Woodpeckers along the road and a pair of valley quails near the mouth of Whiskey Creek. No beaver signs on Draw Creek but my driver says there are a few

beavers on northern branches of Williams River, north of Bly & natives say common in Spangul.

Considerable snow on Cougar Butte and the higher parts of the Warner Mts.

July 22 -

Spent the forenoon getting zone map data from timber maps in Lakeview Forest office and got important data which was added to a copy of map of Fremont Forest.

Climbed up into Warner Mts. far enough to get plenty of Abies albicincta and Populus tremuloides in cold gulches. Listed Sonoran & Transition plants and birds.

Returned to Klamath Falls in afternoon, 2:30 to 7 P.M. and found my zone map checked very well from east to west.

Was told at Beatt Bluff that there are lots of beavers all along Sprague River, probably Elasturus. At the head of Drews Creek and Sprague River almost meet and in high water might appear interminable.